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EXAMINER

GREENE, JASON M

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| ART UNIT | PAPER NUMBER |
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1724

DATE MAILED: 08/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

HC

Office Action Summary

Application No.

10/763,646

Applicant(s)

CHENG, SHI-WAI S.

Examiner

Jason M. Greene

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-13 and 15-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5-13 and 15-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

Response to Arguments

1. Applicant's arguments filed 23 May 2005 have been fully considered but they are not persuasive.

Applicants contend in page 9, lines 9-24 that the Ichikawa et al. reference fails to teach the second end plug trapping ash particles since the porosity of the second end plug overlaps the disclosed porosity of the ash passing first end plug. However, the Examiner disagrees. While the reference discloses examples of the first end plug having a porosity and average pore diameter similar to the second end plug, Ichikawa et al. also discloses examples of the first end plug having a much greater porosity and a much higher average pore size. For example, Ichikawa et al. recites a specific example (Example 7) wherein the first end plug has a porosity of 60% and an average pore diameter of 50 μm in Tables 2 and 3. The Examiner contends that only the first end plugs displaying the disclosed high average pore diameter and high porosity will pass ash particles. The first end plugs having a pore structure similar to the second end plugs will trap ash due to their low average pore size and low porosity and are not seen as being ash passing. In other words, the fact that Ichikawa et al. discloses some of the

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first end plugs having a pore structure similar to the second end plugs does not mean that the second end plugs are ash passing since only the first end plugs having a high average pore size (e.g. 50 μm) and a high porosity (e.g. 60%) will pass ash particles. Furthermore, in claims 5 and 6, Applicants recite the demarcation between ash passing and ash trapping occurring at an average pore size of about 30 μm . Therefore, the Examiner notes that the second end plugs of Ichikawa et al. will trap ash since they have an average pore diameter of 15 μm while the first end plugs of Ichikawa et al. Example 7 will pass ash particles due to their having an average pore diameter of 50 μm . Additionally, while the Examiner agrees that Ichikawa et al. fails to explicitly recite the ash trapping or ash passing properties of the first and second end plugs, Applicants are reminded that "[T]he discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art's functioning, does not render the old composition patentably new to the discoverer." *Atlas Powder Co. v. Ireco Inc.*, 190 F.3d 1342, 1347, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). See MPEP 2112 (I).

Drawings

2. The drawings were received on 23 May 2005. These drawings are acceptable.

Claims

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3. With regard to claim 15, the Examiner suggests Applicants change the word "÷passing" to "passing" to correct an apparent typographical error.

Claim Rejections - 35 USC § 102

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claims 1 and 5-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Ichikawa et al.

With regard to claim 1, Ichikawa et al. discloses a particulate filter for an exhaust system (10) configured to manage an exhaust flow comprising a housing (not numbered, part of the exhaust system 10), and a wall-flow filtration element (12) contained within said housing, said wall-flow filtration element having pores defining a porosity sufficient to trap exhaust particulates and to pass ash particles, said wall-flow filtration element comprising a ceramic monolithic structure having a plurality of porous internal walls (20) defining said inlet and outlet channels, said inlet and outlet channels being separated by said porous internal walls to permit exhaust flow through the pores between the inlet and outlet channels, said inlet channels having an inlet port at one end and a first end-plug (21) at the opposite end, said outlet channels having an outlet port at one end and a second end-plug (22) at the opposite end, said inlet channels

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arranged in fluid communication with said outlet channels, said wall-flow filtration element arranged to receive the exhaust flow at said inlet port and to discharge the exhaust flow at said outlet port, wherein the first end plug has a greater porosity (60%, see Example 7 in Tables 2-3) than said second end plug (45%, see Table 1 and col. 4, lines 45-50), wherein the pores of the first end-plug are sized to trap exhaust particles and permit leakage of ash particles, wherein the pores of the internal walls and the second end-plug are sized to trap both exhaust particles and ash particles, wherein the average pore size of the first end plug is 50 μm (see Example 7 in Tables 2-3) and the pore size of the internal walls and the second end plug are 15 μm (see Table 1 and col. 4, lines 34-50) in Figs. 1-3 and column 1, line 62 to column 9, line 27.

With regard to claims 7 and 9, Ichikawa et al. discloses the housing comprising first and second ends, the inlet port of said inlet channel being at said first end of said housing, and said outlet port being at said second end of said housing, and wherein said inlet and outlet channels and said internal walls are arranged parallel to the exhaust flow in Fig. 1A.

With regard to claim 8, Ichikawa et al. discloses the total surface area of the first end plugs being substantially less than the total surface area of the internal walls in Fig. 1A but does not explicitly recite the exact ratio. However, the ratio can be readily calculated from the honeycomb structure disclosed in col. 4, lines 34-37. Ichikawa et al. recites the honeycomb structure having a cell density of 15.5 cells/cm² and a wall

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thickness of 430 μm . Taking the square root of the cell density yields the honeycomb having 3.94 cells per linear cm or a cell pitch of 0.254 cm or 2.54 mm. From the cell wall thickness, the internal cell width can be calculated to be $2.54 \text{ mm} - 0.430 \text{ mm} = 2.41 \text{ mm}$. Therefore, the cross-sectional area of the cells, and therefore the total surface area of the first end plug, can be calculated as $(2.41 \text{ mm})^2 = 5.81 \text{ mm}^2$. The surface area of the internal walls of each cell can then be determined from the length of 150 mm to be $4 * 2.41 \text{ mm} * 150 \text{ mm} = 1446 \text{ mm}^2$. Since only every other cell is plugged by a first end-plug, the ratio of the surface area of the first end plugs to the surface area of the internal walls can be calculated as $1446 \text{ mm}^2 / (5.81 \text{ mm}^2 / 2) = 1/498$, which is less than $1/240$.

With regard to claims 10 and 11, Ichikawa et al. discloses a particulate filter for an exhaust system (10) configured to manage an exhaust flow comprising a housing (not numbered, part of the exhaust system 10) having a first end and a second end, a wall-flow filtration element (12) arranged within said housing comprising a ceramic monolithic structure having a plurality of porous internal walls (20) defining said inlet and outlet channels, said inlet and outlet channels being separated by said porous internal walls to permit exhaust flow through the pores between the inlet and outlet channels, said inlet channel comprising an inlet port at one end and a first end-plug (21) at the opposite end and configured to receive the exhaust flow at said inlet port, said inlet port arranged at the first end of the housing, an outlet channel comprising an outlet port at one end and a second end-plug (22) at the opposite end and configured to discharge the exhaust from said outlet port, the outlet port arranged at the second end of the

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housing, the first end plug having a greater porosity (60%, see Example 7 in Tables 2-3) than said second end plug (45%, see Table 1 and col. 4, lines 45-50), wherein the pores of the first end-plug are sized (50 μm , see Example 7 in Tables 2-3) to trap exhaust particles and permit leakage of ash particles, wherein the pores of the internal walls and the second end-plug are sized (15 μm , see Table 1 and col. 4, lines 34-50) to trap both exhaust particles and ash particles, wherein the inlet and outlet channels and the internal walls are arranged parallel to the exhaust flow, and wherein the total surface area of the first end plugs is less than $1/240$ ($1/498$, see above) the total surface area of the internal walls in Figs. 1-3 and column 1, line 62 to column 9, line 27.

6. Claims 12 and 15-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Ichikawa et al.

With regard to claims 12, 15 and 16, Ichikawa et al. discloses a method for filtering particulates of an exhaust flow of an exhaust system comprising receiving the exhaust flow at one end of a particulate filter (12) having a ceramic monolith structure with porous walls (20) defining inlet channels and outlet channels, the inlet channels each having an inlet port at one end to receive the exhaust flow and a porous plug (21) at the opposite end, the outlet channels each having an outlet port at one end to discharge the exhaust flow and an end plug (22) at the opposite end, filtering the exhaust flow at the ceramic monolith structure as the exhaust flow passes through the porous walls (20) between the inlet and outlet channels, trapping exhaust byproducts

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of carbonaceous matter and ash particles at the porous walls and the end plugs, trapping exhaust byproducts of carbonaceous matter at the porous plugs, passing ash particles through the porous plugs, and discharging the exhaust flow at the outlet ports, wherein said trapping further comprises trapping ash particles at the porous walls having a pore size of 15 μm (see col. 4, lines 34-50), and said passing further comprises passing ash particles through the porous plugs having a pore size of 50 μm (see Example 7 in Tables 2 and 3) in Figs. 1-3 and column 1, line 62 to column 9, line 27.

With regard to claim 17, Ichikawa et al. discloses receiving the exhaust flow in a direction parallel to the inlet and outlet channels in Fig. 1A.

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ichikawa et al.

Ichikawa et al. discloses regenerating the ceramic monolith structure using blowback in Fig. 1B and col. 3, lines 58-63.

Ichikawa et al. does not explicitly disclose the method of claim 12 further

comprising the converting the trapped exhaust particulates into ash particles.

Ichikawa et al. teaches it being well known to regenerate ceramic monolithic exhaust filters using combustion in col. 1, lines 5-60.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the combustion regeneration of Ichikawa et al. into the exhaust filter of Ichikawa et al. to provide for removal of exhaust byproducts of carbonaceous matter (soot) which are not removed during the blowback operation.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Greene whose telephone number is (571) 272-1157. The examiner can normally be reached on Monday - Friday (9:00 AM to 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on (571) 272-1166. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jason M. Greene
Examiner
Art Unit 1724


8/23/05

jmg
August 23, 2005